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PHYSICAL GEOGRAPHY OF NEW YORK STATE.

BY

RALPH S. TARR.

PART X.—INFLUENCE OF PHYSIOGRAPHIC FEATURES UPON THE INDUSTRIAL DEVELOPMENT OF THE STATE.

THE LUMBERING INDUSTRY.—There are few places in the world in which the environment—climatic and topographic—have not produced an important influence upon human progress. But one would need to look far and wide to find a better illustration of this than is offered by the State of New York. In the main the State consists of a series of plains and much-dissected plateaux, comprised generally of broad valleys and rounded hill-slopes. Semi-mountainous here and there, the surface becomes truly so in two parts only—the Adirondacks and the neighborhood of the Catskills.

These mountains—rugged and rocky—are sparsely settled districts in an otherwise populous State. The unfavorable conditions of soil and topography for a long time discouraged settlement; but recently, on account of the more wide-spread development of the æsthetic sense, those who have leisure have sought those districts because of their varied and picturesque scenery and because of the lower summer temperature which results from their elevation.

The picturesqueness of these mountain districts is partly due to their elevation, as a result of which they have been carved into varied outlines, and partly to the effects of the glacier which has spread over practically the entire State. Moving slowly and irresistibly over the land, the great ice-sheet scoured the hilltops and dragged its load of boulder-clay into the valleys, clogging them here and there, and sometimes transforming them to lakes, sometimes causing the streams to choose new courses, along which they have since dug their channels, carving gorges in the rocks and leaping from layer to layer in cascades, rapids and falls. Thus, by the effect of glaciation, a new beauty has been added to a region already picturesque.

In working upon the hard rocks of the mountains, the glacier has swept off the soil that previously existed, and over large areas has left in its place either bare ledges or a boulder-strewn surface. Neither is the slope too great, nor the climate too rigid, for successful agriculture in most of this mountainous tract; but as a result of the glacial accident the soil is either poor or entirely lacking. Much the same is true concerning the higher hills of the plateau region in southern New York. It has, therefore, not been worth the while to clear off the forests, as has been done elsewhere, so that the hilltops and mountain slopes are still wooded, furnishing a forest reserve long after one would have existed in a more level region. In this respect the Adirondacks and the Catskills resemble northern New England rather than the remainder of New York.

Lumbering, as an industry, is one of the few occupations that are available for those who would dwell among these mountains; for minerals are few and mostly of little value, while building-stones, which might be of use, are too remote from market. Removal of the forests has proceeded so far that little of the primitive growth remains, and even though large sections of the Adirondacks are inaccessible, except on foot, the lumbering operations have extended nearly all over their slopes. This has been rendered possible here, as in Maine, partly by reason of the climate, and partly, once more, by reason of the influence of the glacial period. The cold winter freezes the ponds, swamps and streams, and permits heavy snowfall, which levels over the surface, burying the logs and boulders, thus permitting sledging in the winter, so that supplies may be drawn into the lumber camps and logs be hauled out from the woods. The heavy snows of the steep slopes supply the necessary torrents of spring for the removal of the logs down to saw-mills.

The effect of the glacial period upon this industry is primarily in the formation of lakes, which act as storage reservoirs for the water supply needed by the lumbermen who are driving their logs down stream. Thus a region unfitted for the dense population of an agricultural district is sparsely occupied by those whose business is lumbering. A road map of New York State shows a remarkable blank in the hilly districts of the plateau of Cattaraugus County, (Fig. 1) in the Catskills and the Adirondack.

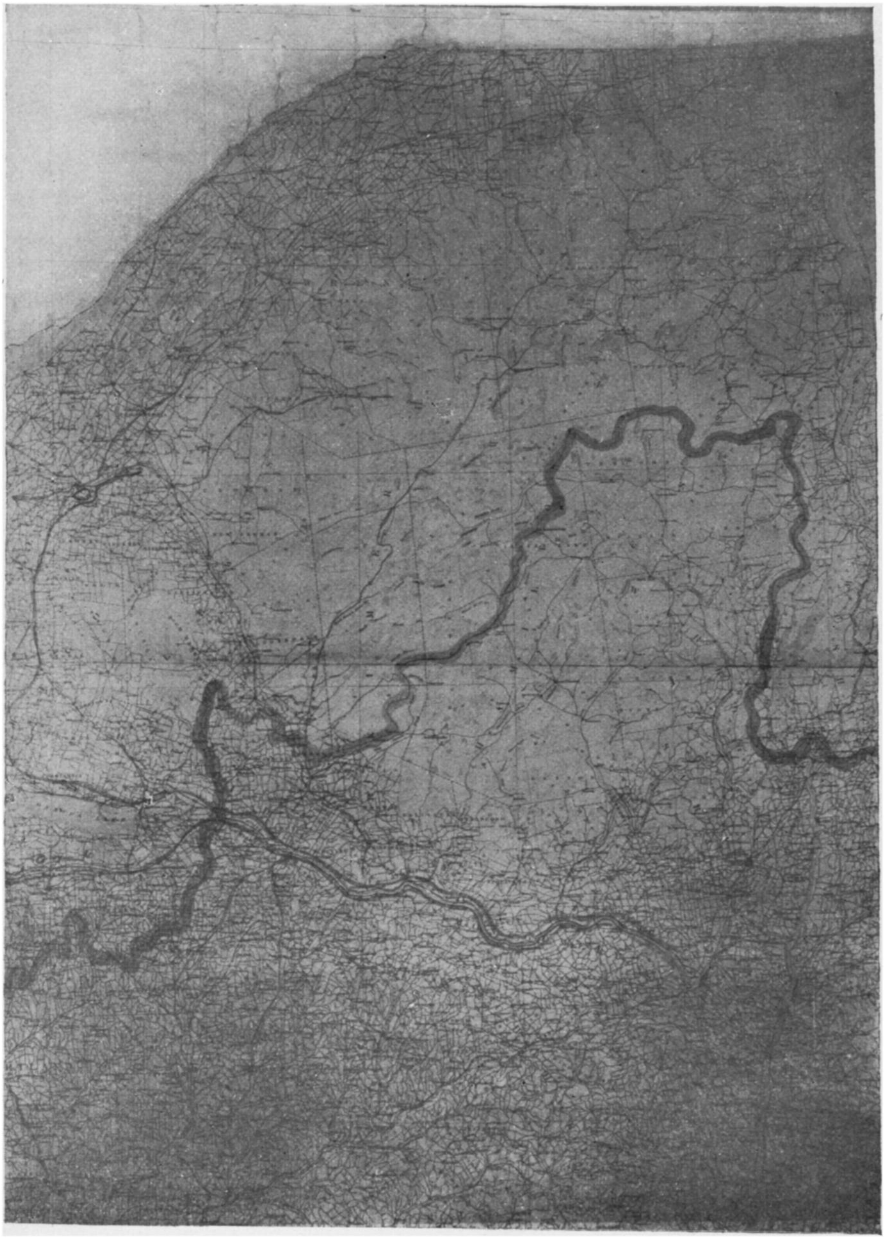

FIG. 1.—ROAD MAP.

The lumbering industry of the mountain districts has naturally had a distinct influence upon the industries of the sections round about. Where hemlock bark is easily accessible, tanneries, and leather work in general, have been possible. Sawmills, lumber mills, paper mills and other industries using timber have naturally developed nearby.

THE AGRICULTURAL INDUSTRY.— The glacial accident has stamped its effects upon the entire State. No doubt before the ice came there was a residual soil caused by rock decay and not unlike that now covering the surface in the more southern States; and no doubt this same kind of soil covered all of New England. This soil was almost entirely swept away, and in its place was set down the present glacial soil, consisting for the most part of a mixture of clay and boulders, here and there of poor quality, but in general strong and favorable to agricultural pursuits. One unacquainted with the explanation, but knowing well the New England and New York region, would scarcely recognize in the two contrasted kinds of soils a single product of ice action. In New England the surface is often so boulder-strewn that it at times seems a wonder that any agriculture should ever have been attempted there; but in New York, outside of the mountainous eastern section, there are so few boulders upon the surface that one rarely sees a stone wall—one of the characteristic features of New England scenery. This difference is due to the kind of rock which the ice found to carry. In New England it bore granite and other hard fragments; in New York, usually softer shales and limestones. Granite rocks were supplied from Canada, it is true; but in their long journey these were generally ground to clay, though here and there "hard heads," which have escaped comminution, may still be seen on the surface. In the neighborhood of the Adirondacks, and other sections where the rocks are hard, the glacial soil closely resembles that of New England.

This soil of glacial origin varies greatly from place to place, so that innumerable minor influences of physiography upon occupations are found. There are glacial plains of compact clay soil that produce crops of apples and pears; there are very extensive beaches of gravel,—the seats of vineyards; there are thin soils, suitable only for pasturage; and there are sandy stretches of little value to the agriculturist. Some sections are smooth and regular; others are so hummocky that farming must almost be done by hand; and some portions of a farm are level, others irregular, some with good soil, others poor. It is along the terminal moraine that the most marked irregularities are found.

The rounded preglacial topography was rendered even less irregular by the ice visit. Hills were lowered by ice-scouring and valleys partly filled with the debris. Therefore, since it left a good soil, the glacier, by smoothing the surface somewhat, made the greater part of the State better adapted to the great agricultural interests which have since developed than it was before the glacial period.

Under conditions of variable soil and irregularity of topography an exceedingly varied agricultural interest has arisen in the State. It has not depended entirely upon the soil, but in part upon the climate and in part upon the needs of the people, developed through the creation of industries of other kinds than agriculture. The influence of climate, for instance, is well illustrated by the important fruit-belts along the shores of lakes Erie, Ontario, Keuka, Seneca and Cayuga, and also along the broad estuary of the Hudson river. The influence arising from the demands of people who are engaged in other industries is illustrated in the neighborhood of each of the cities of the State, where many men are engaged in raising crops almost exclusively for consumption in the cities.

But while these other influences must be considered, the most directly important controlling force in the agricultural development of the State is undoubtedly the soil itself. The glacial soil is strong, and will stand a great deal of unwise culture, although in time even the best becomes exhausted if too heavy a drain is made upon it. Soils of residual origin have been caused by the decay of rocks, during which most of the soluble material has been leached out, although enough is still stored up there to supply plants with the necessary food, and do it so readily that at first wonderfully rich crops are produced; but ere long this abundance of plant food is exhausted and the soil is run down, and has its fertility restored only with great difficulty. This is very clearly illustrated in the overworked and abandoned plantations of the South.

A glacial soil, on the other hand, being composed of rock fragments scoured from the ledges and by the grinding of boulders together, consists of many undecayed, or only partially decayed, rock fragments. These, under the action of frost, or the effect of roots of plants and other agents of rock decay, are slowly furnishing to the glacial soils the very plant food that the vegetation needs. There is, therefore, a steady supply of the elements of fertility, although not quite rapid enough to counteract the heavy drain made by over-tillage. The glacial soil is not a mere storehouse of plant food but a manufactory of it as well; and glacial soils are therefore strong and last for a long time.

THE BEGINNINGS OF MANUFACTURING.—A great agricultural industry, particularly one so varied and specialized as that of New York State, could not have developed unless a market were found for its products. The farmer may supply himself and family with food, and in a crude way may live and have the necessities of life even when entirely isolated; but he cannot go farther than this unless he is able to find some one who needs a part of his products and is willing to exchange for them something which the farmer himself needs. The pioneer settlers, of course, did not have this co-operation; but, just as now there are farmers living in portions of the Far West in practical independence of other people, so then the pioneers were dependent entirely upon their own energies and ingenuity to supply their pressing needs.

There are two natural means by which the products of the soil may be made of value in exchange, and fortunately New York possesses both of these, and the pioneers early developed them. If the natural facilities favor the development of other industries than agriculture, those engaged in these industries will need to be fed by the farmers. Or if people in more distant sections may be easily reached, the crops from the farms may be shipped away in exchange for other products.

From the very earliest settlement of the State other industries than farming have been in existence. At first there was trapping and hunting—a form of industry which supports but a limited population, and that of an unsettled kind, roaming about from place to place. The hunter and trapper is practically as independent of all other people as is the farmer in remote regions; but he, nevertheless, is able and willing to exchange products of the chase for the materials raised on the farm. While the trapper comes first in the settlement of the forested region, the wood-chopper usually succeeds him, sometimes destroying the timber for the purpose of clearing a patch of land for his crops, but often engaging in the business in an extensive way, clearing off the trees and removing the logs (Fig. 2). The lumberman, in a region of good soil, is naturally quickly succeeded by the farmer; so in the early days of the development of the State, after the trapper came the lumberman, and his occupation, not being a food-supplying one, demanded that he should be supplied with what he needed for food and clothing. As now, among the woods of Maine, little patches of meadow land, far away from the

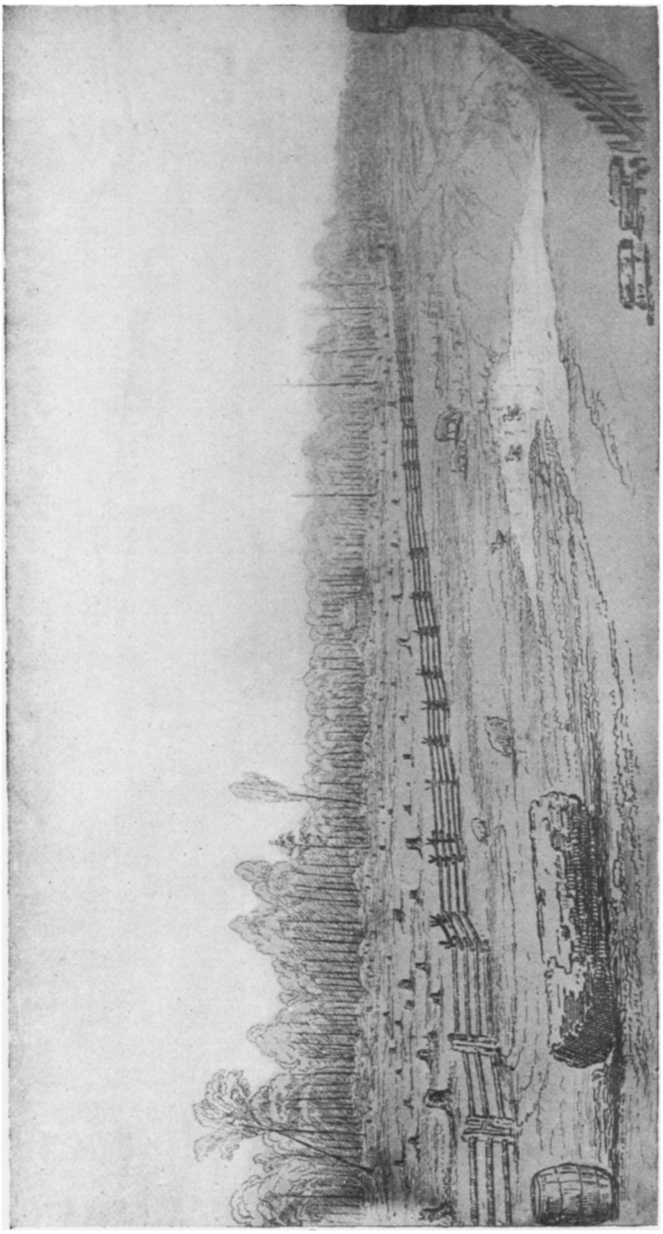

FIG. 2.—FIELD OF TREE STUMPS.

railways, supply their owners with an excellent living because of the crops of hay, potatoes, etc., which they produce for the lumbermen, so in the early days of New York history, one of the sources of profit to the pioneer farmer came from the demands that were made upon him by the lumbermen.

Timber-cutting means not merely the work of cutting the trees and floating the logs away, which would supply employment to but a limited number; it demands that there shall also be much work in preparing the lumber for market. As in the Adirondacks to-day, the lumber where it stands, or in that immediate neighborhood, is of very little value because of the absence of market, so while the forests in the agricultural part of the State were being stripped off, it was necessary not merely to cut the trees but to remove the lumber. As now in the Adirondacks, so then in the remainder of the State the removal of the forests was greatly facilitated by the waterways. Lumber could be floated down the streams and was removed in that way, and this fact has had a great influence upon the State, being of importance not merely because it served as a means for the removal of the forests, but also because it furnished one of the first great proofs of the importance of these waterways.

Therefore, early lumbering was an industry serving not only to employ the men immediately engaged in it—in cutting the trees, floating the logs and sawing them up—but also aiding agriculture partly by clearing off the forests which encumbered the land, and partly by furnishing some support to the growing industry of agriculture through demand for the farm products. It furthermore aided in the industrial development of the State by pointing out the usefulness of the waterways, whose later development has had such notable influence upon the prosperity of the entire State.

The necessity of making the rough logs into lumber and wooden articles, as barrels, laths, shingles, etc., caused the location of sawmills in various parts of the State. This work of transforming the rough lumber to various wooden articles was greatly facilitated by the numerous rapids and waterfalls scattered over the State as a result of the glacial accident which has turned so many streams from their courses and forced them, in choosing new courses, to tumble noisily along over the irregular rock layers. Most of these sawmills have now disappeared, and their water power has come to be utilized for other purposes, so that one travelling over the State at the present time would scarcely realize what an important step in the industrial development of the State this removal and manufacturing of lumber has been. It was the basis for the wealth of many of the families of New York State. Turning their attention to the removal of the forests from the land, they developed a capacity for this form of business which, when the opportunity disappeared through the removal of the forests, was transferred to other regions, even though the man himself remained living where he first began his lumbering operations. Some of the lumbermen worked toward the Adirondacks, other saw still greater opportunities in the West, and much of the development of lumbering in the Michigan and Wisconsin region has depended upon the skill previously acquired in New York State. Now that these western forests are disappearing, one finds the Wisconsin lumbermen transferring their business interests to other fields, as, for instance, the South. One of the unique and important results of this ancient lumber industry is found in the location and development of Cornell University, which owes much of its financial endowment to the lumberman's skill.

Closely succeeding, and in many cases even accompanying the manufacturing which was associated with the removal of the forests, came the development of manufacturing associated with agriculture. And since agriculture has permanently succeeded lumbering, the grist-mills, which were the first of the manufacturing plants related to the agricultural industry, have maintained their hold and are still in operation along the hundreds of creeks which flow with torrential course down their post glacial valleys.

THE LATER DEVELOPMENT OF MANUFACTURING.—Many other forms of manufacturing have developed as the State has become more settled. The grist-mills near the waterfalls of the Genesee at Rochester have developed greatly in importance, and the water-power is utilized for many other forms of manufacturing. The demand of the agriculturist for implements has led to the development of the immense Osborne plant at Auburn. Cheese factories and creameries have developed all over the State, and along the various water routes manufacturing towns engaged in many forms of industry have been established.

The debt that the manufacturing interests of New York State owe to the glacial accident can never be fully stated. The glacier left the country dotted with lakes; and it left many of the streams turned from their courses down slopes over which they flowed rapidly. For this reason, as in the case of New England, most parts of New York came into the possession of almost unlimited water-power. By itself, this might not have been developed as it has been; but aided by the facilities for transportation, and by the increasing density of the agricultural population, the region has, as the result of natural causes, become not only a great agricultural district, but also one of the most important manufacturing regions in the country, with large towns and cities and their consequent multitudes of workers demanding products which the soil is easily made to furnish. With this development of the home market there came also a differentiation in agriculture, until, in addition to grain raising, there have developed the industries of fruit raising, dairying, sheep raising, truck farming and the other great agricultural interests for which the State is noted.

The State has not begun to realize all of its natural resources of water-power, the most impressive example of unused facilities being Niagara Falls, also a product of the glacial accident. This immense cataract, for a long time merely a great fall, to see which people journeyed from all countries, is now, like its less notable neighbors, which exist by thousands in the State, being made to take a share in the industrial progress of New York. This almost inexhaustible water-power is being put to use, though it seems almost desecration to fill the beautiful gorge, and line its banks, with great tubes and unsightly power-houses, and to transform the border of the cataract into a busy city with its throng of unsympathetic workers. This is, however, an age of progress in which the needs of mankind take precedence over sentiment; and Niagara is destined not merely to light and furnish the electric power for Buffalo, but also to run countless manufactories in its neighborhood. It promises to become the greatest source of power in the whole world, and to furnish industrially a marvellous illustration of the grandeur of nature's forces, as it has in the past filled the traveller with awe.

MINERAL RESOURCES.—The mineral resources of the State have not done much, as compared with many other States, to aid in the industrial development of the region. Aside from iron mined in a few places, certain building-stones found here and there, and a relatively small amount of petroleum,—the northern continuation of the Pennsylvania field,—the State has supplied little else of mineral origin excepting salt. This latter product, however, has been of marked importance. While at present it is producing so great an output that it employs many thousands of workers, and determines the position of a number of towns and villages, in the past it was even more important, although its output was vastly less extensive. The salt springs at Syracuse, resorted to by the Indians, and used by them, became a centre of importance in the early days of pioneer travel; and later, when the settlers of the neighborhood needed salt, these springs led to the development of the industry which located one of the large cities of the State. Syracuse has passed the day when it was a great salt-producing city; but the seat of this early industry attained sufficient size to warrant its future development as a result of other industries.

The lack of coal would have been a much greater drawback to New York State had it not been for the presence of extensive deposits of this mineral not far away in the neighboring State. Very early this was transported into New York for manufacturing purposes, and across the State for use in more remote regions; and the coal-carrying trade of the early days was one of the important aids to the development of the great water routes of New York, and helped to determine some of the cities, as, for instance, Ithaca.

THE WATERWAYS.—A home and foreign market of the present size could not have been created in New York State had there been no natural facilities for the transportation of the products of manufacture. But with facilities for transportation, the agricultural industry of New York has far exceeded the demands of the immediate home market, and the products of the farm, as well as those of the factories, are sent far and wide. While at present man has in some respects risen considerably above the influence of his immediate environment, in the early days of the development of New York State the surroundings had an immense influence upon the conditions of life. In those days the time had not yet come when railways could penetrate into the remote, seemingly almost inaccessible, regions; natural pathways were followed, and among these the most potent have been the water routes.

The State is traversed by such a series of natural water highways that it has always been possible to travel by water over a large part of its area. Besides the two great lakes, Ontario and Erie—separated, to be sure, by the impassable Niagara Falls—there are Lake Chautauqua, the several Finger Lakes, Oneida Lake, Lake George, Lake Champlain, the St. Lawrence River, the Hudson, the Mohawk, the Susquehanna and the Allegheny, besides innumerable small lakes and rivers. Upon these the Indians travelled by canoe; and the early white pioneers followed the same means of entrance. Numerous falls and rapids required "carrys," and "carrys" were often necessary across divides; but, nevertheless, it was possible to penetrate deeply into the New York wilderness. The importance of this ready access is illustrated with great clearness in the early history of the State; the Dutch settlements along the Hudson, and the pushing of the frontier line up the Mohawk, and out over the plains of north-central New York, and along the lake shores, tell of the influence of the waterways.

Since railways were not then thought of, as the development of the State continued beyond the primitive stage when canoeing sufficed, the demand for better means of entrance and exit from New York naturally led to the construction of canals. Owing to the large river valleys, and to the numerous lakes, a few canals opened up to larger boats a great expanse of country. Each of these has had an important influence upon the development of the State; but the great scheme for the improvement of the waterways of New York was the building of the long Erie canal. Nature invited this, and the wisdom of some of the early statesmen of New York led to the acceptance of the invitation.

The sinking of the land, or its "drowning," had admitted the ocean tide up the Hudson River beyond Albany. The glacial accident had transformed two streams, one flowing westward, one flowing eastward, into the east-flowing Mohawk, with a gentle slope from the divide near Rome, with one or two exceptions, all the way down to the Hudson. From Rome westward there stretched a plain greatly levelled by glacial erosion and deposit, and covered so deeply with drift that for a large part of the distance from the Hudson to Lockport, the digging of the canal required merely earth excavation and little rock work. The one great obstacle to the construction of the canal was the escarpment at Lockport, to surmount which considerable ingenuity was required; but, after reaching the crest of the upper plain, the remainder of the route to Buffalo was simple. This opened up communication not only across the entire State, but to the then unsettled and unknown West. Short side canals connected the Erie canal with Lake Erie and the Finger Lakes, and these in turn were but a short distance from the Susquehanna.

No one can ever estimate the importance of this canal system in the development of the City of New York and the State as a whole. The direct benefits, when it was the only means of transportation of materials, are well understood. The indirect influence, in leading to the construction of railways, is, perhaps, not so widely appreciated. There are many who believe that the usefulness of this canal system is of the past; that the present day has outgrown the conditions of canal boating. Doubtless they are correct in so far as canals of the small Erie type are concerned; but no one who has thoughtfully considered the influence of the Erie canal on the past can have any question as to the future value of an enlarged Erie canal, which shall admit the ships of the lakes and furnish a free passageway across the State. There are always those who question the value of large expenditures; there were such objectors at the time of the proposition of the Erie canal itself; and there are even now those who question the wisdom of spending large sums in further improvements; but fortunately it is a characteristic of our race that objectors of this kind are always in the minority.

A combination of physiographic causes has conspired to make New York City a great commercial centre. The aid of man in the construction of canals, and later of railways, has determined that it shall be the greatest commercial centre of the nation, and doubtless, in the not very distant future, of the entire world. It stands at one of the gateways into the interior of the continent, the other two being the St. Lawrence and the Mississippi. The mouth of the latter is too far south, and the most productive part of the country is too distant and too difficult to reach. The St. Lawrence, with its great city of Montreal, furnishes another natural gateway into the continent; but it is frozen for months, and, owing to the fact that the international boundary practically prohibits its use as an exit for the products of the northern United States, it leads into a much less productive section than the Hudson gate. The latter reaches back into the most productive portion of the American continent. Railways now centre toward the splendid harbor at the end of the Hudson estuary, and ships that pass down the Hudson, and the canal boats that travel from the West, are headed toward this great shipping point. It is needed now to make water connection more easily possible.

This is but a general statement of some of the more salient features upon which the development of the State as a whole has depended, a mere hint as to the direction in which it would be easily possible to extend the discussion if we were to commence upon further detail.

It might readily be shown why some parts have become the seats of the dairy industry; others of grain production; others still of vineyards, orchards, etc., either because of features of climate or soil or physiography; and it might also be shown that some portions have remained nearly unsettled, and are destined to remain so in the future because of distinctly unfavorable conditions. Moreover, there is scarcely a town whose origin and development have not been profoundly influenced by the surroundings. In some it is water-power and manufacturing; in others, agriculture, or the outlet of a canal, or the discovery of iron, salt, oil, or other mineral products, etc. We could also dwell upon the influence of physiography upon those great aids to commercial development, the railways, and study in detail how closely they have been obliged to follow natural routes. One gains an impressive lesson in this connection when he attempts to travel by rail from central New York to western Pennsylvania.

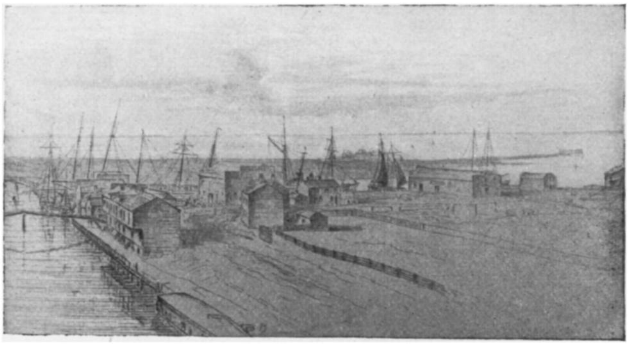

FIG. 3.—EARLY BUFFALO.

How Buffalo has grown as New York City has developed, because goods bound to or from New York City have needed to have their mode of transport changed from rail or canal boat to lake boat, or *vice versa!* What a chain of important cities there is along the natural water route and its improved extension, the Erie Canal! This is no mere matter of chance; nature provided for it and man merely accepted the conditions, adapted himself to them, and improved upon them where slight improvement promised great reward.

This point of the dependence of industrial development upon the natural conditions is one to which especial attention needs to be called in these days when man so easily overcomes obstacles, causing railways to ascend to the mountain passes or to plunge directly through the mountain. Now, man is in part the master of his surroundings; but even at present he is not fully free from their influence, and the time was when the environment, more than any other single cause, directed his movements and guided his progress. We ought not to be allowed to forget this.